Operating and Installation Manual

Fire damper type FKR-EU

according to Declaration of Performance

DoP / FKR-EU / DE / 2013 / 001

CE

TROX® TECHNIK

The art of handling air

Contents

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1 General information

This operating and installation manual describes the following variants of the fire damper:

- FKR-EU with fusible link
- FKR-EU with spring return actuator

To ensure complete functioning of the fire damper it is essential to read the provided operating and installation manual before starting any work, and to comply with it. The manual must be given to the facilities manager when handing over the system. The facilities manager must include the manual with the system documentation.

The manufacturer does not accept any liability for any malfunction or damage resulting from non-compliance with this manual or non-compliance with relevant statutory regulations.

This operating and installation manual is intended for specialist consultants, developers, and operators of systems in which the fire dampers are to be installed. This manual is also intended for people conducting the following work:

- Transport and storage
- Installation
- Electrical connection
- Commissioning
- Operation
- Maintenance
- Decommissioning, removal and disposal

Scope of this manual

This operating and installation manual applies to fire dampers that are installed in Germany. National regulations must be observed.

Other applicable documentation

In addition to this manual the declaration of performance DoP / FKR-EU / DE / 2013 / 001 applies.

Symbols used in this manual

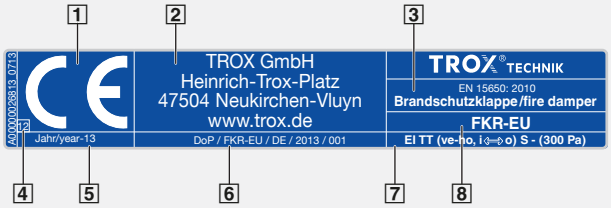
Danger!
Designates danger to life and limb due to electrical voltage.

Warning!
Designates danger to life and limb.

Important!
Designates danger that can cause minor personal injury or damage to property.

Note!
Designates important notes or information.

Rating plate with CE marking



1 CE mark
2 Manufacturer's address
3 Number of the European standard and year of its publication
4 The last two digits of the year of the marking
5 Year of manufacture
6 No. of the declaration of performance
7 Regulated characteristics
The fire resistance class depends on the application and may vary → P. 9
8 Type

2 Safety and correct use

General information regarding safety

Only skilled, qualified personnel are allowed to perform the described work on the fire damper.
Only skilled qualified electricians are allowed to work on the electrical system.

The installation location must be easily accessible and have sufficient clearance for electrical connection and maintenance of the fire damper.

Standards and guidelines

- EN 15650:2010 Ventilation for buildings – fire dampers
- Classification to EN 13501-3 → P. 9
- Tested to EN 1366-2
- Closed blade air leakage to EN 1751, class 4
- Casing air leakage according to EN 1751, class C

Compliance with all additional related fire protection standards and regulations is required.

Repair and replacement parts

The FK-EU fire damper is a safety related product that has been especially developed for fire protection. To maintain the function, only original TROX replacement parts must be used.

Environmental protection

To protect the environment observe the following:

- Dispose of packaging in an environmentally sound manner.
- Have used fire damper components or the used fire damper only disposed of by an authorised company.
- Dispose of electronic components according to the local electronic waste regulations.

Correct use

The fire damper is used as an automatic shut-off device to prevent fire and smoke from spreading through ducting.

The fire damper is suitable for supply air and extract air systems. Use of the fire damper is only allowed in compliance with national fire protection regulations. Operation of the fire damper is allowed only in compliance with installation regulations and the technical data in this operating and installation manual.

Incorrect use

The following applications are not allowed:

- Use as a smoke extract damper.
- Use in potentially explosive atmospheres.
- Use outdoors without sufficient protection against the effects of weather.
- Use in extract air systems in commercial kitchens.
- Use in ventilation systems in which high levels of contamination, extreme humidity, or chemical contamination may impair the damper function.
- Installation in a way that prevents an inspection of the internal components of the fire damper.

Changes to the fire damper and the use of replacement parts that have not been approved by TROX are not permitted.

Residual risks

TROX fire dampers are subject to strict quality controls during manufacturing. In addition, function tests are performed before delivery. In addition, a functional test is performed before delivery.

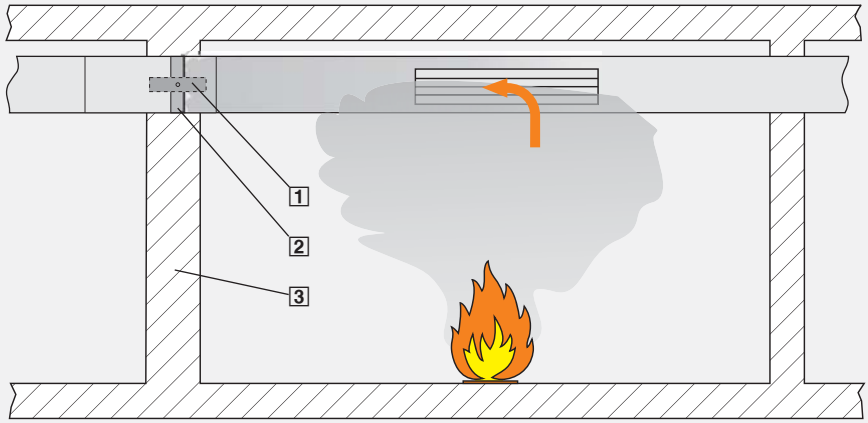
Damage can, however, occur during transport or installation and impair the function of the fire damper.

In any case, the proper function of the fire damper must be checked during commissioning and ensured through regular maintenance while in use.

3 Product description

Functional description

Functional diagram



1 Damper blade OPEN
2 Damper blade CLOSED in case of a fire
3 Fire-resistant wall

Functional description

Type FKR-EU fire dampers are used as safety related components in ventilation systems. The fire damper is used to to prevent fire and smoke from spreading through ducting.

During operation at normal temperature, the fire damper is open to enable air passage through the ventilation system. If the temperature increases in case of a fire, the damper blade closes. The damper is triggered either by a fusible link at 72 °C (95 °C in the case of warm air ventilation systems) or thermoelectrically with a spring return actuator.

If the damper blade closes due to a temperature increase (i.e. in case of a fire), it must not be reopened.

The proper functioning of the fire damper can be tested in two ways, depending on the release mechanism. → P. 24

FKR-EU with fusible link

If the temperature inside the fire damper rises to 72 °C or 95 °C, respectively, the fusible link triggers a coil spring mechanism which causes the damper blade to close. The coil spring mechanism then causes the fire damper to close.

As an option, the FKR-EU with a fusible link can be either supplied or subsequently fitted with one or two limit switches. The limit switches can signal the damper blade position to the central BMS or fire alarm system. One limit switch each is required for damper blade positions OPEN and CLOSED.

FKR-EU with spring return actuator

The spring return actuator enables the motorised opening and closing of the damper blade; it can be activated by the central BMS. As long as power is supplied to the actuator, the damper blade remains open.

In case of a fire, the fire damper is closed by the internal thermoelectric release mechanism when the temperature in the duct rises above 72 °C or 95 °C, respectively, or when the temperature on the actuator of the fire damper rises above 72 °C or when the supply voltage fails (power off to close).

As standard, the spring return actuator is equipped with limit switches that can be used to indicate the damper blade position.

TROX smoke detector

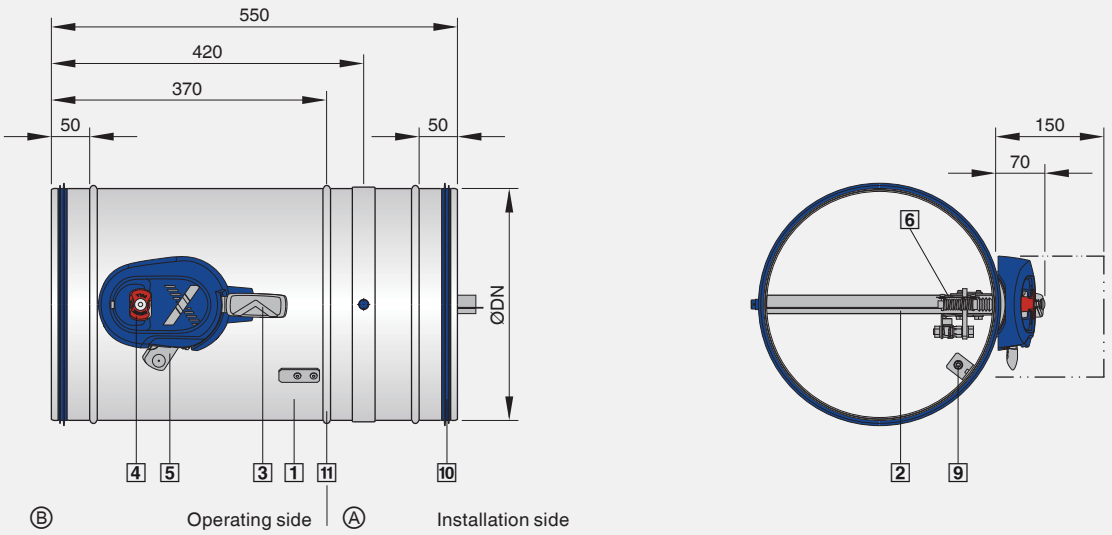
The TROX smoke detector type RM-O-3-D or RM-O-VS-D can be used to trigger closing of the FKR-EU damper blade. This is only possible when the fire damper is equipped with a spring return actuator.

3 Product description

Product overview, dimensions, and weights

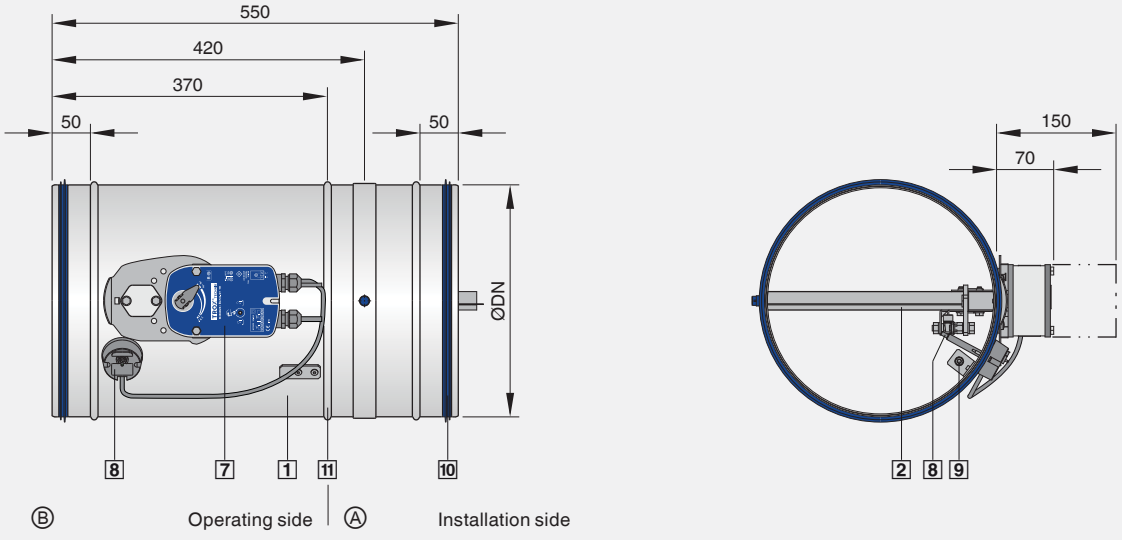
Construction variant with spigots

FKR-EU with fusible link



----- Keep clear to provide access to the release mechanism

FKR-EU with spring return actuator



----- Keep clear to provide access to the spring return actuator

FKR-EU and FKR-EU-FL Dimensions [mm]									
Nominal size	315	355	400	450	500	560	630	710	800
ØDN	314	354	399	449	498	558	629	709	799
A	31	31	31	36	36	36	36	36	36
ØD1	352	392	438	488	538	600	670	750	840
α	45°	45°	45°	45°	45°	30°	30°	30°	22.5°
Number of screw holes	8	8	8	8	8	12	12	12	16

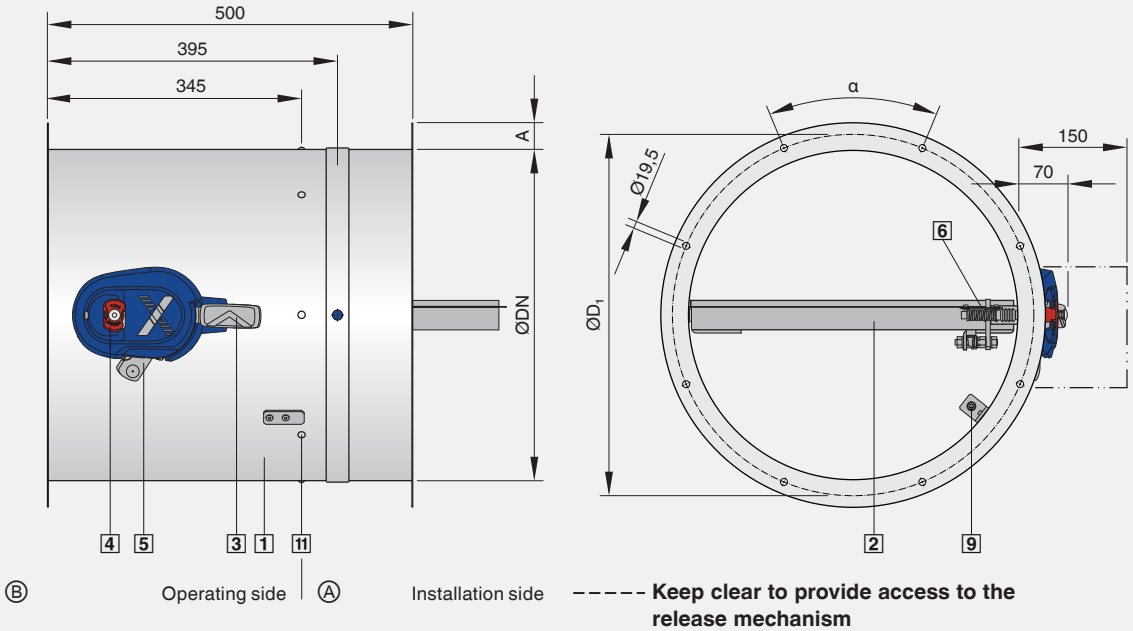
FKR-EU and FKR-EU-FL Weight [kg]									
Nominal size	315	355	400	450	500	560	630	710	800
with fusible link	6.8	7.3	8.5	14.1	16.4	18.0	21.3	25.7	28.6
with spring return actuator	8.2	8.7	9.9	16.7	19.0	20.6	23.9	28.3	31.2

3 Product description

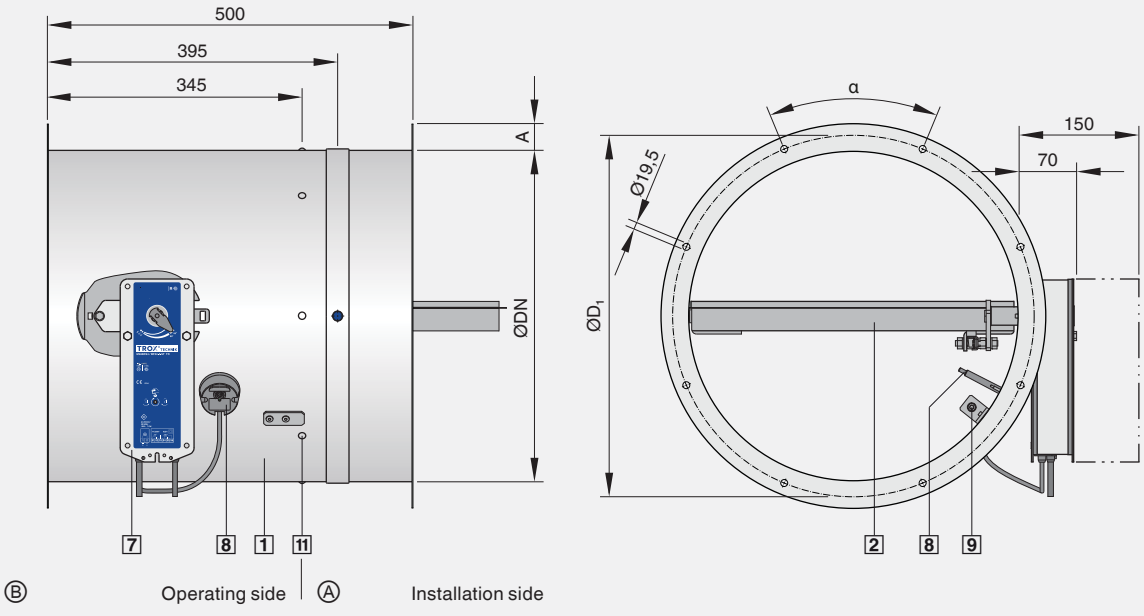
Product overview, dimensions, and weights

Flange construction

FKR-EU-FL with fusible link



FKR-EU-FL with spring return actuator



1 Casing
2 Damper blade with seal
3 Handle
4 Release mechanism with cover
5 Interlock
6 Fusible link
7 Spring return actuator
8 Thermoelectric release mechanism
9 Travel stop
10 Lip seal
11 Installation marking ØDN ≤ 400: grove; ØDN ≥ 450: indentation
Ⓐ Installation side
Ⓑ Operating side

4 Technical data

Limit switch	
Connecting cable length / cross section	1 m / 3 × 0.34 mm²
Protection level	IP 66
Type of contact	1 changeover contact, gold-plated
Max. switching current	0.5 A
Max. switching voltage	30 V DC, 250 V AC
Contact resistance	approx. 30 mΩ

Spring return actuator BLF		230-T TR	24-T-ST TR
Supply voltage		230 V AC ±14 % 50/60 Hz	24 V AC ±20 % 50/60 Hz or 24 V DC -10 % / +20 %
Power rating	Spring compression	6 W	5 W
	Hold position	3 W	2.5 W
	Rating	7 VA	
Running time	Motor / spring return	40 to 75 s / 20 s	
Limit switch	Type of contact	2 change-over contacts	
	Switching voltage	5 – 120 V DC / 5 – 250 V AC	
	Switching current	1 mA – 3 A	
	Contact resistance	< 100 mΩ	
IEC protection class		II	III
Protection level		IP54	
Storage temperature		–40 ... +50°C	
Ambient temperature		–30 ... +50 °C [1]	
Ambient humidity		≤ 95 % RH, non-condensing	
Connecting cable	Actuator	1 m / 2 × 0.75 mm²	
	Limit switch	1 m / 6 × 0.75 mm²	

Spring return actuator BF		230-T-2 TR	24-T-ST-2 TR
Supply voltage		230 V AC ±14 % 50/60 Hz	24 V AC ±20 % 50/60 Hz or 24 V DC -10 % / +20 %
Power rating	Spring compression	8 W	7 W
	Hold position	3 W	2 W
	Rating	12.5 VA	10 VA
Running time	Motor / spring return	approx. 140 s / approx. 16 s	
Limit switch	Type of contact	2 change-over contacts	
	Switching voltage	5 – 120 V DC / 5 – 250 V AC	
	Switching current	1 mA – 6 A	
	Contact resistance	< 100 mΩ	
IEC protection class		II	III
Protection level		IP54	
Storage temperature		–40 ... +50°C	
Ambient temperature		–30 ... +50 °C [1]	
Ambient humidity		≤ 95 % RH, non-condensing	
Connecting cable	Actuator	1 m / 2 × 0.75 mm²	
	Limit switch	1 m / 6 × 0.75 mm²	

[1] Up to 75 °C the safe position will definitely be reached.

5 Transport, storage, and packaging

Important!
Danger of injury from edges and sheet metal parts.
Always wear protective gloves when handling the unit.

Delivery check

Check delivered items immediately after arrival for transport damage and completeness. In case of any damage or an incomplete shipment, contact the shipping company and your supplier immediately.

A complete shipment includes:

- Fire damper
- Attachments / accessories, if any
- Operating manual (1 per shipment)

Transport on site

If possible, take the fire damper in its transport packaging up to the installation location.

Storage

If the fire damper has to be stored temporarily:

- Remove any plastic wrapping.
- Store the fire damper in a clean place, away from dust and pollution.
- Store the unit in a dry place and away from direct sunlight.
- Do not expose the fire damper (not even with its packaging) to the effects of weather.
- Do not store the fire damper below -40 °C or above 50 °C.

Packaging

Properly dispose of packaging material.

6 Installation

General installation information

Important!
Danger of injury from edges and sheet metal parts.
Always wear protective gloves when handling the unit.

The fire damper can be installed in any orientation. Minimum wall and ceiling slab thicknesses. → See table below.

Please note:

- Operating components and the electric actuator must remain accessible for inspection and maintenance work.
- If the thickness of the wall or ceiling slab exceeds 115 mm, an extension piece (accessory or provided by others) is required to connect the fire damper to the duct.
- Perform a functional test before installation. → P. 24
- Do not remove the transport and installation safety device until the mortar/concrete has hardened.

Acceptable mortars for mortar-based installation

In case of mortar-based installation, the open spaces between the fire damper and the wall or ceiling slab must be closed off with mortar. Entrapped air is to be avoided. The mortar bed depth must be at least 100 mm.

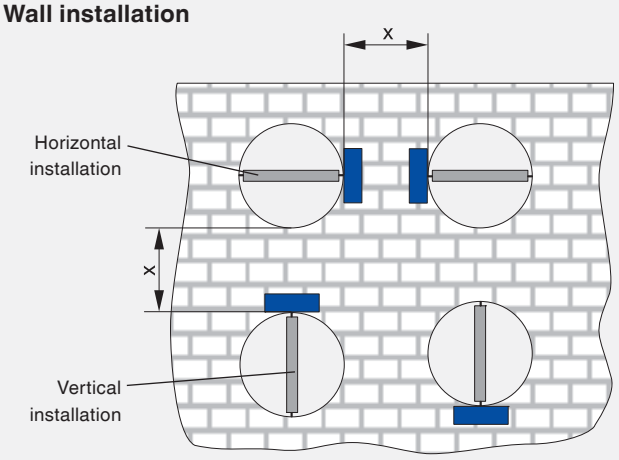
The following mortars are acceptable:

- DIN 1053: Groups II, IIa, III, IIIa; fire protection mortar of groups II, III
- EN 998-2: Classes M 2.5 to M 10, or fire protection mortar of classes M 2.5 and M 10
- Equivalent mortars that meet the requirements of the above standards
- Gypsum mortar or concrete

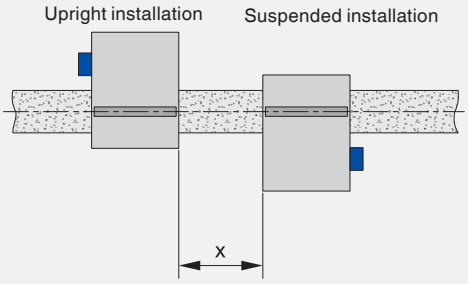
Acceptable mineral wool as filling material

Mineral wool with gross density ≥ 80 kg/m³, melting point ≥ 1000 °C.

Wall installation



Ceiling installation



x = see corresponding installation details

Note!
The fire resistance classes of the fire damper and the wall/celing slab may differ from each other. The final fire resistance class of the total system, however, is determined by the lower fire resistance class.

Overview of installation situations and fire resistance class according to 13501-3

Installation location	Construction and building material	Minimum thickness [mm]	Class of performance EI TT (ve–ho, i ↔ o) S	Installation details on page
Solid walls	Solid walls, gross density ≥ 500 kg/m³	100	EI 120 S	10
Solid ceiling slabs	Solid ceiling slabs, gross density ≥ 600 kg/m³	150	EI 120 S	11
Lightweight partition walls with metal support structure and cladding on both sides	Lightweight partition walls	100	EI 90 S	12
Fire walls with metal support structure and cladding on both sides	Fire walls	115	EI 90 S	18
Lightweight partition walls with metal support structure and cladding on one side	Shaft walls	90	EI 90 S	13
Lightweight partition walls without metal support structure and cladding on one side	Shaft walls	50	EI 90 S	16

6 Installation

Solid walls

Mortar-based installation

For mortar-based installation of fire dampers in solid walls the fire damper is concreted into the wall during construction or alternatively installed after construction with a perimeter mortar bed.

Requirements

- Solid walls or fire walls (if referred to as such) made of, for example, concrete, aerated concrete, masonry, or solid gypsum wallboards according to EN 12859 (without hollow spaces), gross density ≥ 500 kg/m³, and a minimum thickness of 100 mm
- 40 mm minimum distance to load bearing structural elements.
- 40 mm minimum distance between two fire dampers, about 80 mm with flanged construction

Warning!
Contamination or damage will impair the function of the fire damper.
- Protect the fire damper from contamination and damage.
- Cover the flange openings and release mechanism (e.g. with plastic foil) to protect them from mortar and dripping water.

Installation while erecting the wall

If the fire damper is installed as the wall is being erected, the perimeter gap »s« is not required.

To install the fire damper, proceed as follows:

- Place the fire damper on a bed of mortar in the planned installation position in the wall and secure it. Also observe distance dimension z. → Table.
- If the wall thickness is > 115 mm, extend the fire damper with an extension piece or a spiral duct on the installation side.
- Brick the fire damper into the wall with a perimeter bed of mortar.

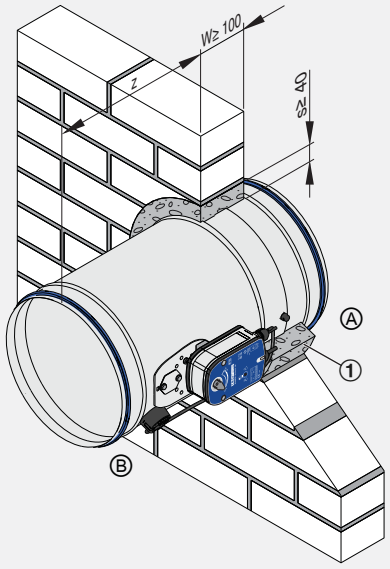
Installation after completing the wall

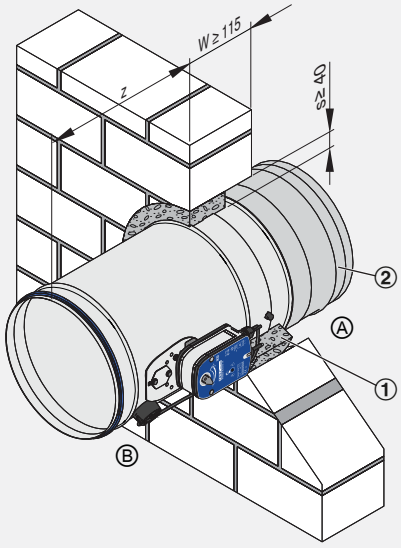
To install the fire damper into a completed wall, proceed as follows:

- Create an appropriate opening or cut hole: Ø opening = nominal size of the fire damper + at least 80 mm
- Push the fire damper into the installation opening and secure it. Also observe distance dimension z. → Table.
- If the wall thickness is > 115 mm, extend the fire damper with an extension piece or a spiral duct on the installation side.
- Close off the perimeter gap »s« with mortar. The mortar bed depth must be at least 100 mm.

After installation

- Clean the fire damper and wash off any residual mortar with water.
- The fire damper is provided with a transport and installation safety device. This safety device must not be removed until after the mortar has hardened. → P. 21
- After the hardening of the mortar, perform a functional test of the fire damper. → P. 24
- Connect the ducting. → P. 21
- Establish the electrical connection. → P. 23





① Mortar → „Acceptable mortars for mortar-based installation“ see Page 9
② Extension piece
Ⓐ Installation side
Ⓑ Operating side

Distance z [mm]	
FKR-EU with spigots	370
FKR-EU with flanges	345

6 Installation

Solid ceiling slabs

Mortar-based installation

Fire dampers are concreted in during the construction of the ceiling or installed using a perimeter mortar-mix after the completion of the ceiling slab.

Requirements

- Solid ceiling slabs made of concrete or aerated concrete, gross density ≥ 600 kg/m³ and D ≥ 150 mm
- 40 mm minimum distance to load bearing structural elements.
- 40 mm minimum distance between two fire dampers, about 80 mm with flanged construction

Warning!
Contamination or damage will impair the function of the fire damper.

- Protect the fire damper from contamination and damage.
- Cover the flange openings and release mechanism (e.g. with plastic foil) to protect them from mortar and dripping water.

Installation while completing the ceiling slab

If the fire damper is installed as the ceiling slab is being completed, the perimeter gap »s« is not required.

- Place the fire damper in the installation location and secure it. Also observe distance dimension z. → Table.
- Protect the spigot and the operating components/actuator, e.g. with plastic foil.
- Extend the fire damper with an extension piece or a spiral duct on the installation side.
- Cast the concrete around the fire damper.

Installation after completing the ceiling slab

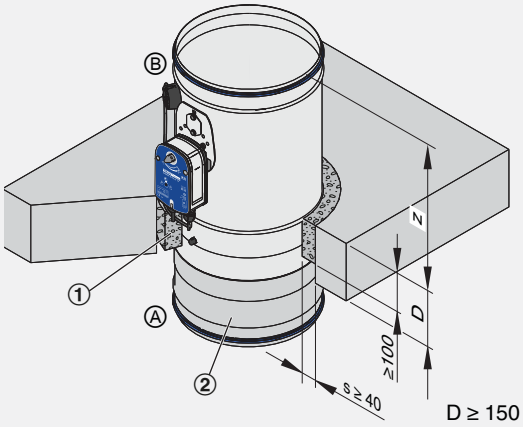
To install the fire damper into a completed ceiling slab, proceed as follows:

- Create an appropriate opening or cut hole: Ø opening = nominal size of the fire damper + at least 80 mm
- Push the fire damper into the installation opening and secure it. Also observe distance dimension z. → Table.
- Extend the fire damper with an extension piece or a spiral duct on the installation side.
- Close off the perimeter gap »s« with mortar. The mortar bed depth must be at least 100 mm.

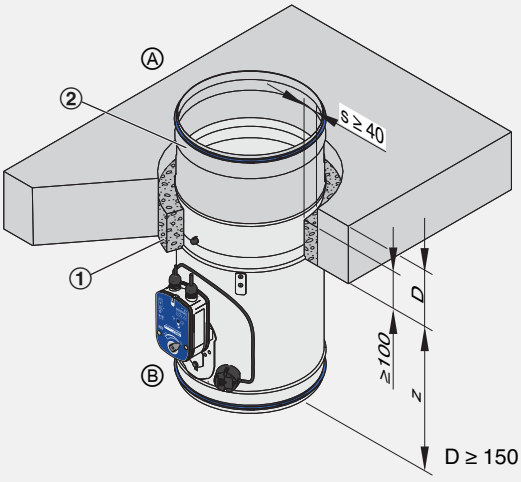
After installation

- Clean the fire damper and wash off any residual mortar with water.
- The fire damper is provided with a transport and installation safety device. This safety device must not be removed until after the mortar has hardened. → P. 21
- After the hardening of the mortar, perform a functional test of the fire damper. → P. 24
- Connect the ducting. → P. 21
- Establish the electrical connection. → P. 23

Upright installation



Suspended installation



① Mortar → „Acceptable mortars for mortar-based installation“ see Page 9
② Extension piece
Ⓐ Installation side
Ⓑ Operating side

Distance z [mm]	
FKR-EU with spigots	370
FKR-EU with flanges	345

6 Installation

Lightweight partition walls with metal support structure and cladding on both sides

Nominal size ØDN 315 to 400

Mortar-based installation

Fire dampers with a perimeter mortar mix are used for mortar-based installation into lightweight partition walls.

Requirements

- Lightweight partition walls with a metal support structure and cladding on both sides, with European classification to EN 13501-2 or comparable national classification
- Cladding made of gypsum bonded or cement bonded panel materials and a minimum wall thickness of W ≥ 100 mm
- Additional layers of cladding are approved.
- Installation details for special versions, e.g. double stud system, up request.
- 40 mm minimum distance to load bearing structural elements.
- 40 mm minimum distance between two fire dampers, about 80 mm with flanged construction

Warning!
Contamination or damage will impair the function of the fire damper.

- Protect the fire damper from contamination and damage.
- Cover the flange openings and release mechanism (e.g. with plastic foil) to protect them from mortar and dripping water.

To install the fire damper, proceed as follows:

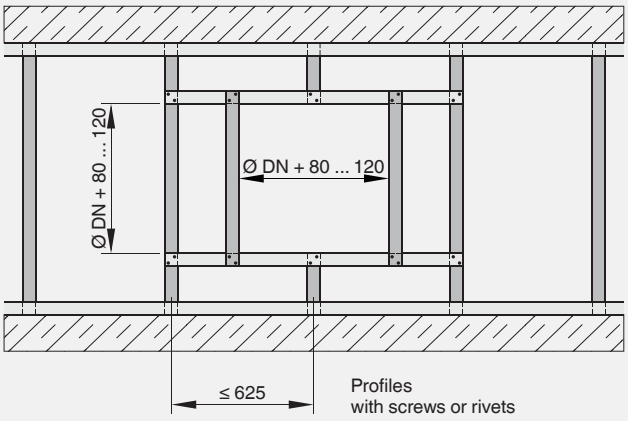
- Erect the lightweight partition wall according to the manufacturer's instructions.
- Create an installation opening. Provide the installation opening in the metal support structure with support profiles.
- Insert trim panels (optional).
- Push the fire damper into the wall opening. Also observe distance dimension z. → Table.
- If the wall thickness is > 115 mm, extend the fire damper with an extension piece or a spiral duct on the installation side.
- Completely close off the perimeter gap »s« with mortar across the complete wall thickness.

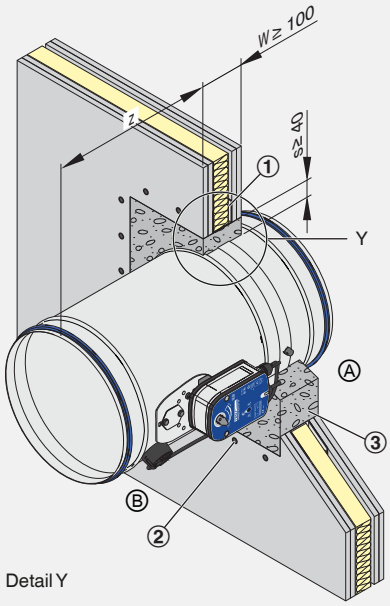
After installation

- Clean the fire damper and wash off any residual mortar with water.
- The fire damper is provided with a transport and installation safety device. This safety device must not be removed until after the mortar has hardened. → P. 21
- After the hardening of the mortar, perform a functional test of the fire damper. → P. 24
- Connect the ducting. → P. 21
- Establish the electrical connection. → P. 23

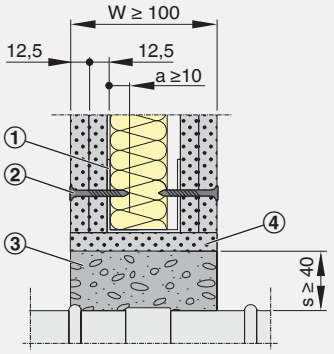
Distance z [mm]	
FKR-EU with spigots	370
FKR-EU with flanges	345

Metal support structure, nominal size ØDN 315 to 400





Detail Y



① Perimeter metal profile
② Dry wall screw
③ Mortar, preferably gypsum mortar
→ „Acceptable mortars for mortar-based installation“ see Page 9
④ Optional trim panels
Ⓐ Installation side
Ⓑ Operating side

6 Installation

Lightweight partition walls with metal support structure and cladding on both sides

Nominal size ØDN 450 to 800

Mortar-based installation

Fire dampers with a perimeter mortar mix are used for mortar-based installation into lightweight partition walls.

Requirements

- Lightweight partition walls with a metal support structure and cladding on both sides, with European classification to EN 13501-2 or comparable national classification
- Cladding made of gypsum bonded or cement bonded panel materials, wall thickness of W ≥ 100 mm
- Additional layers of cladding are approved.
- Installation details for special versions, e.g. double stud system, up request.
- 40 mm minimum distance to load bearing structural elements.
- 40 mm minimum distance between two fire dampers, about 80 mm with flanged construction

Warning!
Contamination or damage will impair the function of the fire damper.

- Protect the fire damper from contamination and damage.
- Cover the flange openings and release mechanism (e.g. with plastic foil) to protect them from mortar and dripping water.

To install the fire damper, proceed as follows:

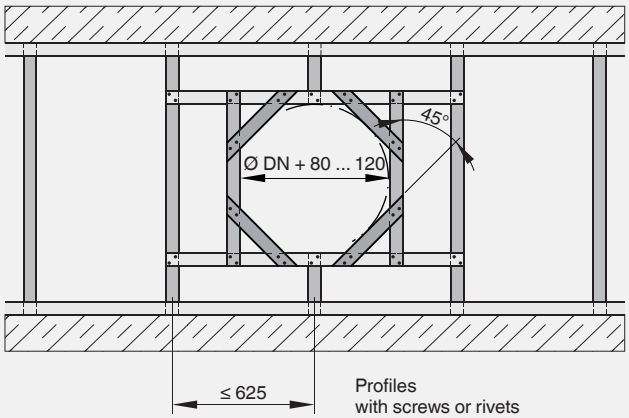
- Erect the lightweight partition wall according to the manufacturer's instructions.
- Create an installation opening. To do so, provide the installation opening in the metal support structure with support profiles. From nominal size 450, reinforce the support structure with four additional profiles installed under 45°.
- Insert trim panels (optional).
- Push the fire damper into the wall opening. Also observe distance dimension z. → Table.
- If the wall thickness is > 115 mm, extend the fire damper with an extension piece or a spiral duct on the installation side.
- Completely close off the perimeter gap »s« with mortar across the complete wall thickness.

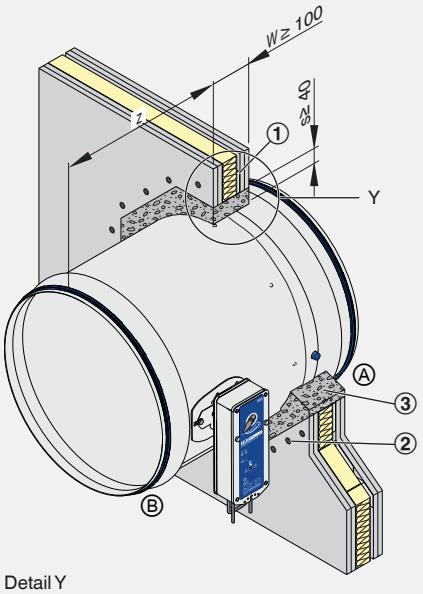
After installation

- Clean the fire damper and wash off any residual mortar with water.
- The fire damper is provided with a transport and installation safety device. This safety device must not be removed until after the mortar has hardened. → P. 21
- After the hardening of the mortar, perform a functional test of the fire damper. → P. 24
- Connect the ducting. → P. 21
- Establish the electrical connection. → P. 23

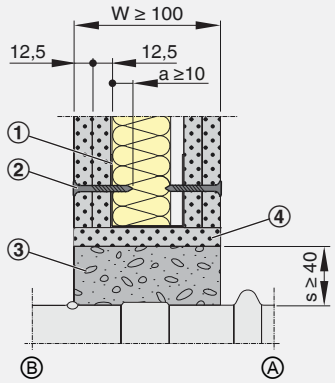
Distance z [mm]	
FKR-EU with spigots	370
FKR-EU with flanges	345

Metal support structure, nominal size ØDN 450 to 800





Detail Y



① Perimeter metal profile
② Dry wall screw
③ Mortar, preferably gypsum mortar
→ „Acceptable mortars for mortar-based installation“ see Page 9
④ Optional trim panels
Ⓐ Installation side
Ⓑ Operating side

6 Installation

Lightweight partition walls with metal support structure and cladding on one side

Nominal size ØDN 315 to 400

Mortar-based installation

Fire dampers with a perimeter mortar mix are used for mortar-based installation into lightweight partition walls.

Requirements

- Lightweight partition walls with a metal support structure and cladding on one side with European classification according to EN 13501-2 or comparable national classification
- Cladding made of gypsum bonded or cement bonded panel materials and a minimum thickness of 90 mm
- Additional reinforcing board near the fire damper, at least 20 mm thick
- Maximum wall height 5,000 mm
- 40 mm minimum distance to load bearing structural elements.
- 200 mm minimum distance between two fire dampers

Warning!
Contamination or damage will impair the function of the fire damper.

- Protect the fire damper from contamination and damage.
- Cover the flange openings and release mechanism (e.g. with plastic foil) to protect them from mortar and dripping water.

To install the fire damper, proceed as follows:

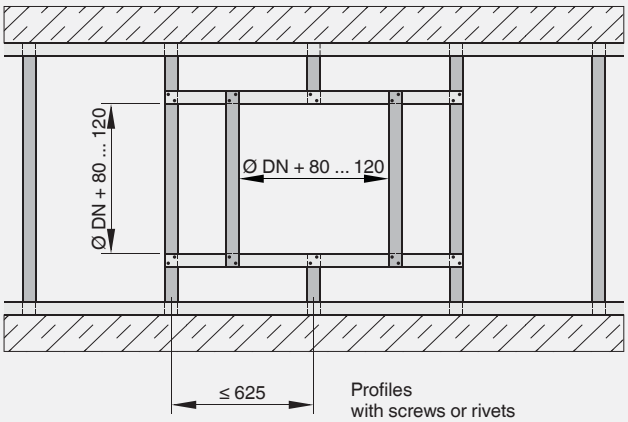
- Erect the lightweight partition wall according to the manufacturer's instructions.
- Create an installation opening. Provide the installation opening in the metal support structure with support profiles.
- Create reinforcing board.
- Push the fire damper into the wall opening. Also observe distance dimension z. → Table.
- If the wall thickness is > 115 mm, extend the fire damper with an extension piece or a spiral duct on the installation side.
- Completely close off the perimeter gap s« with mortar across the complete wall thickness.

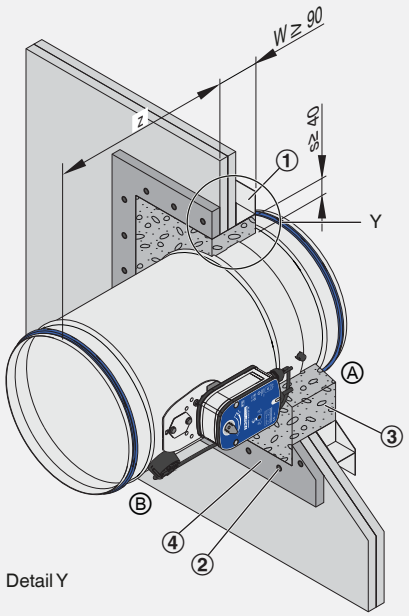
After installation

- Clean the fire damper and wash off any residual mortar with water.
- The fire damper is provided with a transport and installation safety device. This safety device must not be removed until after the mortar has hardened. → P. 21
- After the hardening of the mortar, perform a functional test of the fire damper. → P. 24
- Connect the ducting. → P. 21
- Establish the electrical connection. → P. 23

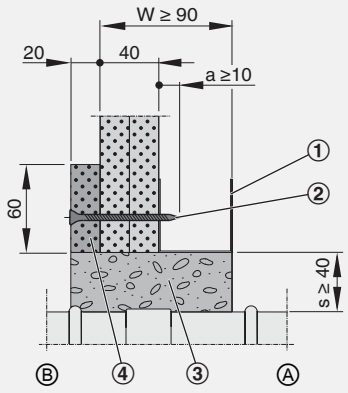
Distance z [mm]	
FKR-EU with spigots	370
FKR-EU with flanges	345

Metal support structure up to nominal size 400





Detail Y



① Perimeter metal profile
② Dry wall screw
③ Mortar, preferably gypsum mortar
→ „Acceptable mortars for mortar-based installation“ see Page 9
④ Reinforcing board
Ⓐ Installation side
Ⓑ Operating side

6 Installation

Lightweight partition walls with metal support structure and cladding on one side

Nominal size ØDN 450 to 800

Mortar-based installation

Fire dampers with a perimeter mortar mix are used for mortar-based installation into lightweight partition walls.

Requirements

- Lightweight partition walls with a metal support structure and cladding on one side with European classification according to EN 13501-2 or comparable national classification
- Cladding made of gypsum bonded or cement bonded panel materials and a minimum thickness of 90 mm
- Additional reinforcing board near the fire damper, at least 20 mm thick
- Maximum wall height 5,000 mm
- 40 mm minimum distance to load bearing structural elements.
- 200 mm minimum distance between two fire dampers

Warning!
Contamination or damage will impair the function of the fire damper.

- Protect the fire damper from contamination and damage.
- Cover the flange openings and release mechanism (e.g. with plastic foil) to protect them from mortar and dripping water.

To install the fire damper, proceed as follows:

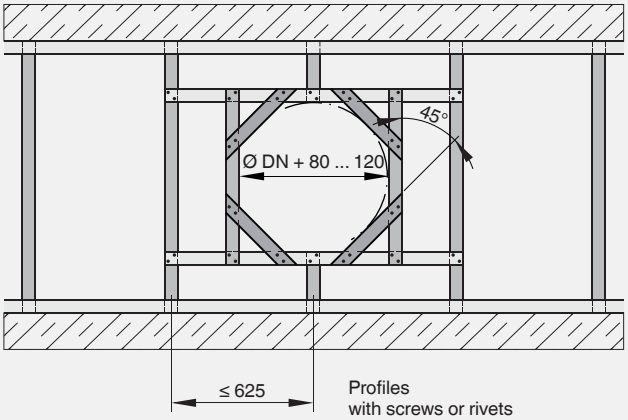
- Erect the lightweight partition wall according to the manufacturer's instructions.
- Create an installation opening. To do so, provide the installation opening in the metal support structure with support profiles. From nominal size 450, reinforce the support structure with four additional profiles installed under 45°.
- Create reinforcing board.
- Push the fire damper into the wall opening. Also observe distance dimension z. → Table.
- If the wall thickness is > 115 mm, extend the fire damper with an extension piece or a spiral duct on the installation side.
- Completely close off the perimeter gap s« with mortar across the complete wall thickness.

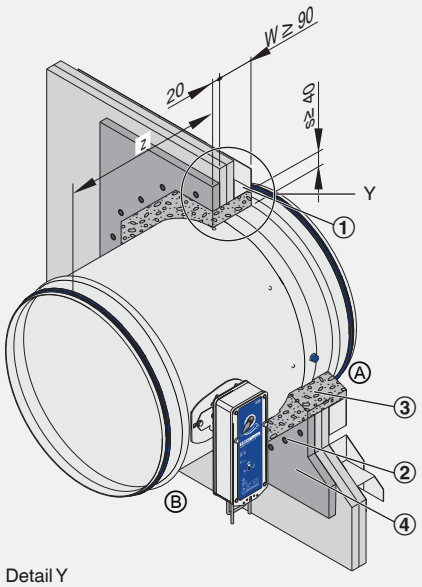
After installation

- Clean the fire damper and wash off any residual mortar with water.
- The fire damper is provided with a transport and installation safety device. This safety device must not be removed until after the mortar has hardened. → P. 21
- After the hardening of the mortar, perform a functional test of the fire damper. → P. 24
- Connect the ducting. → P. 21
- Establish the electrical connection. → P. 23

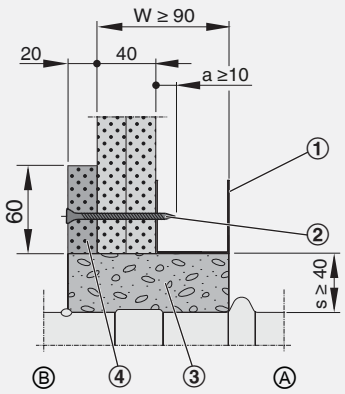
Distance z [mm]	
FKR-EU with spigots	370
FKR-EU with flanges	345

Metal support structure from nominal size 450





Detail Y



① Perimeter metal profile
② Dry wall screw
③ Mortar, preferably gypsum mortar
→ „Acceptable mortars for mortar-based installation“ see Page 9
④ Reinforcing board
Ⓐ Installation side
Ⓑ Operating side

6 Installation

Lightweight partition walls without metal support structure and cladding on one side (shaft walls)

Nominal size ØDN 315 to 400

Mortar-based installation
Fire dampers with perimeter mortar mix are used for mortar-based installation into lightweight partition walls.

Requirements

- Lightweight partition walls without metal support structure but with cladding on one side with wall thickness W ≥ 50 mm
- Additional reinforcing board near the fire damper, at least 50 mm thick
- Wall width 2,000 mm
- Maximum wall height 5,000 mm
- 40 mm minimum distance to load bearing structural elements.
- 200 mm minimum distance between two fire dampers

Warning!
Contamination or damage will impair the function of the fire damper.

- Protect the fire damper from contamination and damage.
- Cover the flange openings and release mechanism (e.g. with plastic foil) to protect them from mortar and dripping water.

To install the fire damper, proceed as follows:

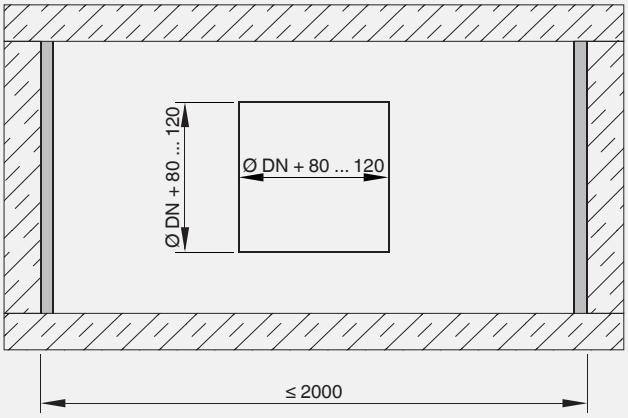
- Erect the lightweight partition wall according to the manufacturer's instructions.
- Make a square installation opening as shown in the opposite drawing.
- Mount the wall cladding and reinforcing board.
- Push the fire damper into the installation opening and secure it. Also observe distance dimension z. → Table.
- Close off the perimeter gap »s« with mortar. The mortar bed depth must be at least 100 mm.

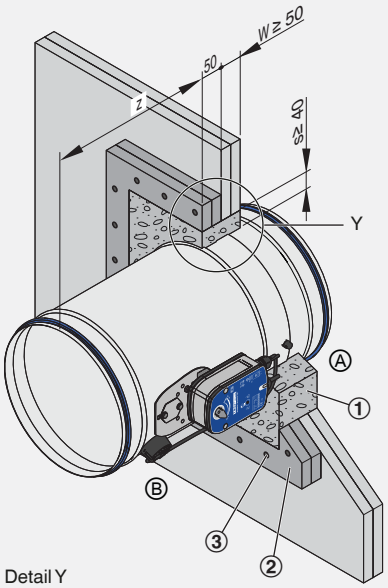
After installation

- Clean the fire damper and wash off any residual mortar with water.
- The fire damper is provided with a transport and installation safety device. This safety device must not be removed until after the mortar/concrete has hardened. → P. 21
- After the hardening of the mortar, perform a functional test of the fire damper. → P. 24
- Connect the ducting. → P. 21
- Establish the electrical connection. → P. 23

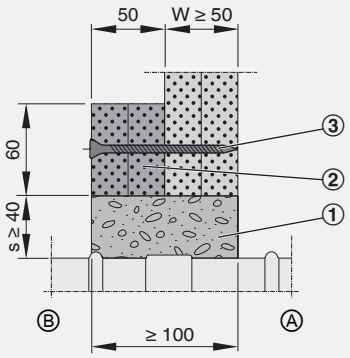
Distance z [mm]	
FKR-EU with spigots	370
FKR-EU with flanges	345

Installation details of nominal size ØDN 315 to 400





Detail Y



① Mortar, preferably gypsum mortar
→ „Acceptable mortars for mortar-based installation“ see Page 9
② Reinforcing board
③ Dry wall screw
Ⓐ Installation side
Ⓑ Operating side

6 Installation

Lightweight partition walls without metal support structure and cladding on one side (shaft walls)

Nominal size ØDN 450 to 800

Mortar-based installation

Fire dampers with perimeter mortar mix are used for mortar-based installation into lightweight partition walls.

Requirements

- Lightweight partition walls without metal support structure but with cladding on one side with wall thickness W ≥ 50 mm
- Additional reinforcing board near the fire damper, at least 20 mm thick
- Wall width 2,000 mm
- Maximum wall height 5,000 mm
- 40 mm minimum distance to load bearing structural elements.
- 200 mm minimum distance between two fire dampers

Warning!
Contamination or damage will impair the function of the fire damper.

- Protect the fire damper from contamination and damage.
- Cover the flange openings and release mechanism (e.g. with plastic foil) to protect them from mortar and dripping water.

To install the fire damper, proceed as follows:

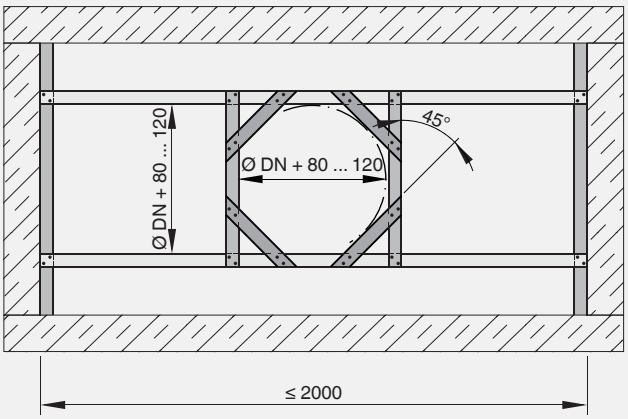
- Erect the lightweight partition wall according to the manufacturer's instructions.
- Create an installation opening. To do so, provide the installation opening in the metal support structure with support profiles. Reinforce the support structure with four additional profiles installed under 45°.
- Mount the wall cladding and reinforcing board.
- Push the fire damper into the installation opening and secure it. Also observe distance dimension z. → Table.
- Close off the perimeter gap »s« with mortar. The mortar bed depth must be at least 120 mm.

After installation

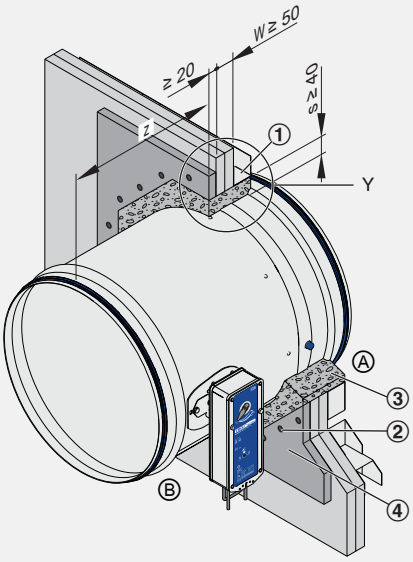
- Clean the fire damper and wash off any residual mortar with water.
- The fire damper is provided with a transport and installation safety device. This safety device must not be removed until after the mortar/concrete has hardened. → P. 21
- After the hardening of the mortar, perform a functional test of the fire damper. → P. 24
- Connect the ducting. → P. 21
- Establish the electrical connection. → P. 23

Distance z [mm]	
FKR-EU with spigots	370
FKR-EU with flanges	345

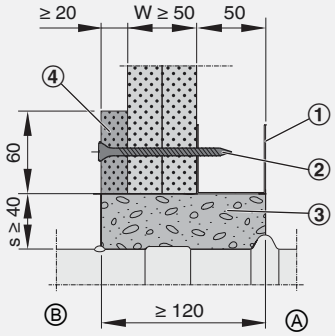
Installation details of nominal size ØDN 450 to 800



Profiles
with screws or rivets



Detail Y



① Perimeter metal profile
② Dry wall screw
③ Mortar, preferably gypsum mortar
→ „Acceptable mortars for mortar-based installation“ see Page 9
④ Reinforcing board
Ⓐ Installation side
Ⓑ Operating side

6 Installation

Fire walls with metal support structure and cladding on both sides

Nominal size ØDN 315 to 400

Mortar-based installation

Fire dampers with a perimeter mortar mix are used for mortar-based installation into fire walls.

Requirements

- Lightweight partition walls with a metal support structure and cladding on both sides, with European classification to EN 13501-2 or comparable national classification
- Cladding made of gypsum bonded or cement bonded panel materials and a minimum wall thickness of W ≥ 115 mm
- Sheet steel inserts, additional layers of cladding, or double stud systems (Details → P. 20) are approved.
- Maximum wall height 5,000 mm
- 40 mm minimum distance between two fire dampers, about 80 mm with flanged construction

Warning!
Contamination or damage will impair the function of the fire damper.

- Protect the fire damper from contamination and damage.
- Cover the flange openings and release mechanism (e.g. with plastic foil) to protect them from mortar and dripping water.

To install the fire damper, proceed as follows:

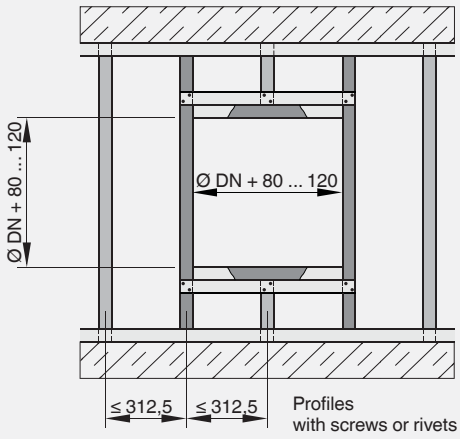
- Erect the metal support structure according to the manufacturer's instructions. Provide the installation opening with support profiles as shown in the figure opposite (Details → P. 20).
- Mount the wall cladding and, optionally, the trim panel.
- Push the fire damper into the wall opening. Also observe distance dimension z. → Table.
- Secure the fire damper in place.
- If the wall thickness is > 115 mm, extend the fire damper with an extension piece or a spiral duct on the installation side.
- Completely close off the perimeter gap s« with mortar across the complete wall thickness.

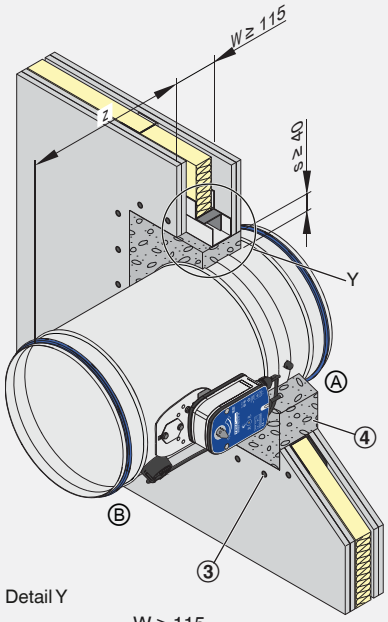
After installation

- Clean the fire damper and wash off any residual mortar with water.
- After the hardening of the mortar, perform a functional test of the fire damper. → P. 24
- Connect the ducting. → P. 21
- Establish the electrical connection. → P. 23

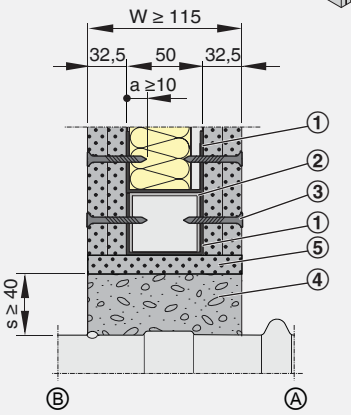
Distance z [mm]	
FKR-EU with spigots	370
FKR-EU with flanges	345

Metal support structure up to nominal size 400
Details → P. 20





Detail Y



① UW profile
② UA profile
③ Dry wall screw
④ Mortar, preferably gypsum mortar
→ „Acceptable mortars for mortar-based installation“ see Page 9
⑤ Optional trim panels
Ⓐ Installation side
Ⓑ Operating side

6 Installation

Fire walls with metal support structure and cladding on both sides

Nominal size ØDN 450 to 800

Mortar-based installation

Fire dampers with a perimeter mortar mix are used for mortar-based installation into fire walls.

Requirements

- Lightweight partition walls with a metal support structure and cladding on both sides, with European classification to EN 13501-2 or comparable national classification
- Cladding made of gypsum bonded or cement bonded panel materials and a minimum wall thickness of W ≥ 115 mm
- Sheet steel inserts, additional layers of cladding, or double stud systems (Details → P. 20) are approved.
- Maximum wall height 5,000 mm
- 40 mm minimum distance between two fire dampers, about 80 mm with flanged construction

Warning!
Contamination or damage will impair the function of the fire damper.

- Protect the fire damper from contamination and damage.
- Cover the flange openings and release mechanism (e.g. with plastic foil) to protect them from mortar and dripping water.

To install the fire damper, proceed as follows:

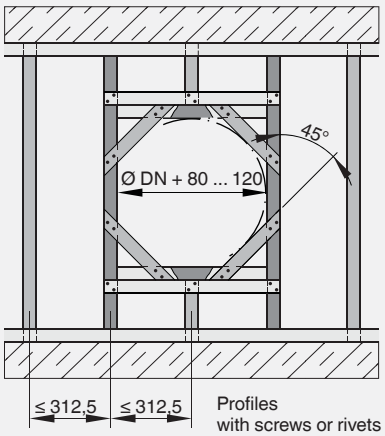
- Erect the metal support structure according to the manufacturer's instructions. Provide the installation opening with support profiles as shown in the figure opposite (Details → P. 20). Reinforce the support structure with four additional profiles installed under 45°.
- Mount the wall cladding and, optionally, the trim panel.
- Push the fire damper into the wall opening. Also observe distance dimension z. → Table.
- Secure the fire damper in place.
- If the wall thickness is > 115 mm, extend the fire damper with an extension piece or a spiral duct on the installation side.
- Completely close off the perimeter gap s« with mortar across the complete wall thickness.

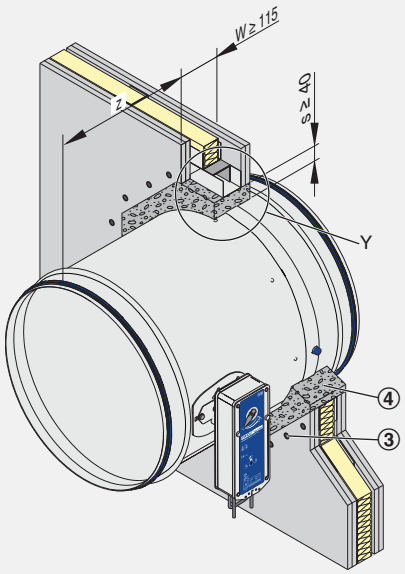
After installation

- Clean the fire damper and wash off any residual mortar with water.
- After the hardening of the mortar, perform a functional test of the fire damper. → P. 24
- Connect the ducting. → P. 21
- Establish the electrical connection. → P. 23

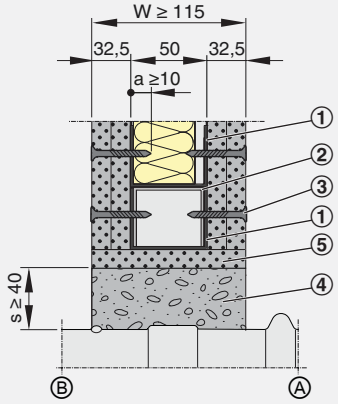
Distance z [mm]	
FKR-EU with spigots	370
FKR-EU with flanges	345

Metal support structure from nominal size 450
Details → P. 20





Detail Y

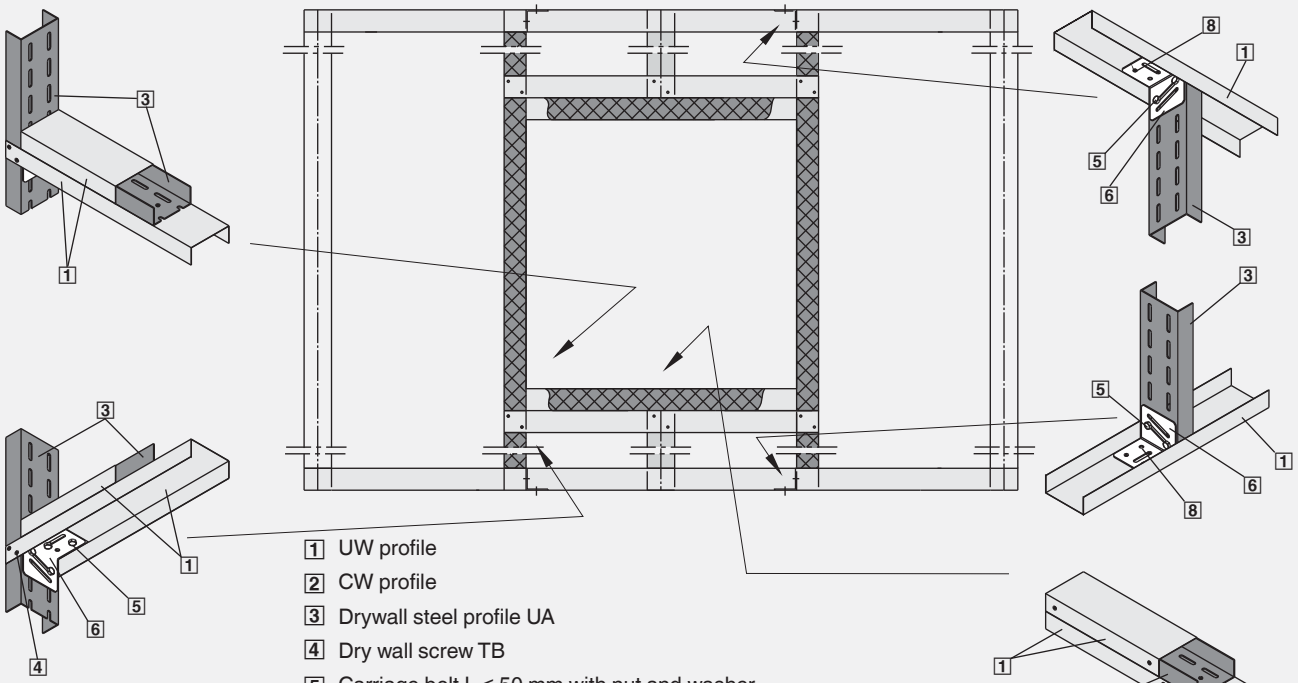


① UW profile
② UA profile
③ Dry wall screw
④ Mortar, preferably gypsum mortar
→ „Acceptable mortars for mortar-based installation“ see Page 9
⑤ Optional trim panels
Ⓐ Installation side
Ⓑ Operating side

6 Installation

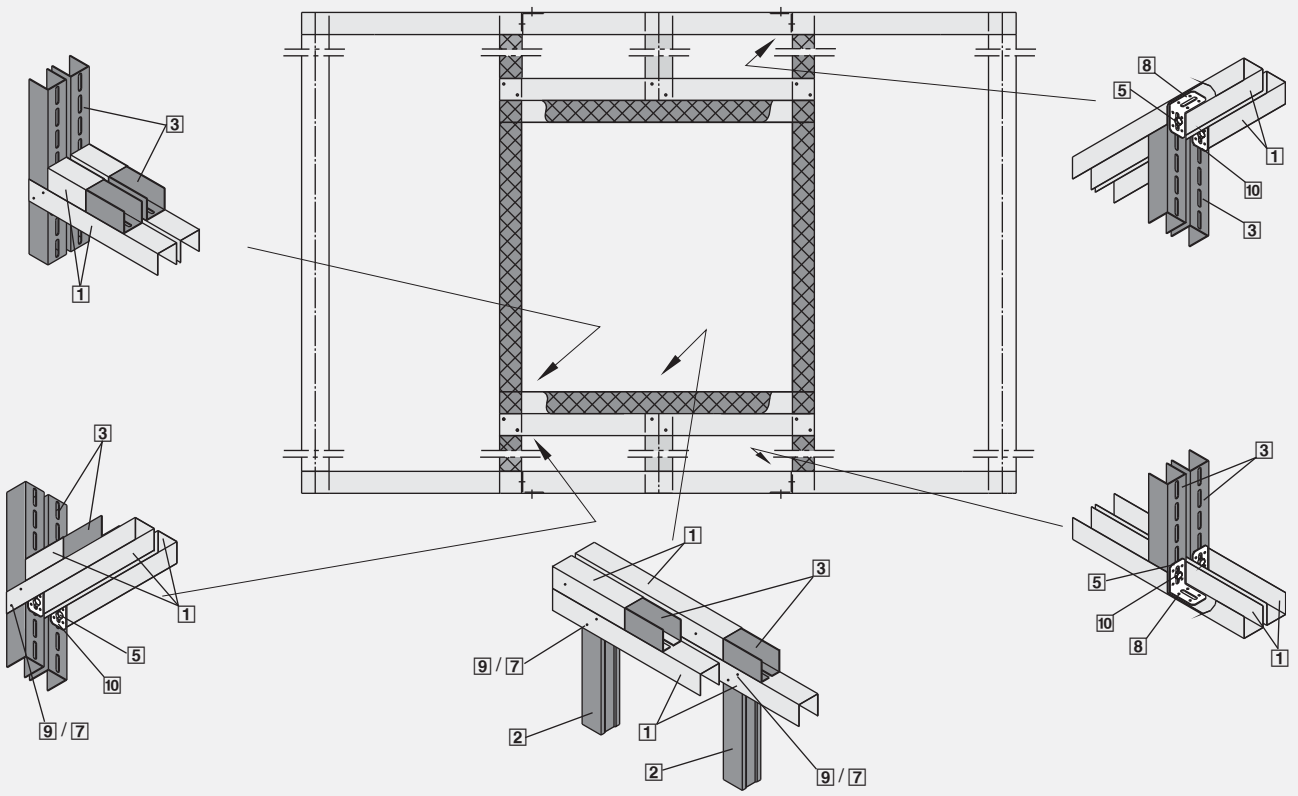
Fire walls with metal support structure and cladding on both sides

Metal support structure for fire walls - details



1 UW profile
2 CW profile
3 Drywall steel profile UA
4 Dry wall screw TB
5 Carriage bolt L ≤ 50 mm with nut and washer
6 Connecting bracket
7 Steel rivet Ø 4 mm
8 2 × screws Ø 6 mm with anchor or hammer-in fixing
9 Dry wall screw Ø 3.9 × 35 mm
10 UA connecting bracket

Construction elements according to manufacturer's instructions

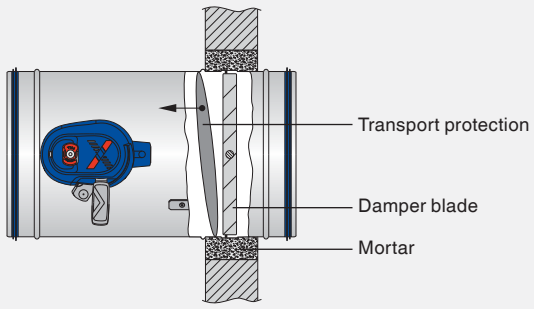


7 Connecting the duct

Removing the transport/installation protection

The fire dampers are provided with a transport and installation safety device. In case of mortar-based installation this protection must not be removed until the mortar has hardened.

To remove the transport/installation protection, pull it out of the fire damper on the operating side.



Flexible connectors

Ducting must be installed in such a manner that it does not impose any loads on the fire damper in case of a fire.

For information on how to limit such loads please refer to the guideline regarding fire protection requirements on ventilation systems (Lüftungsanlagen-Richtlinie, LüAR).

The expansion of ducts in case of a fire may be compensated by brackets and turns; see picture to the right.

As ducts may expand and walls may become deformed in case of a fire, we recommend for the following applications using flexible connectors when connecting the fire damper to rigid ducts:

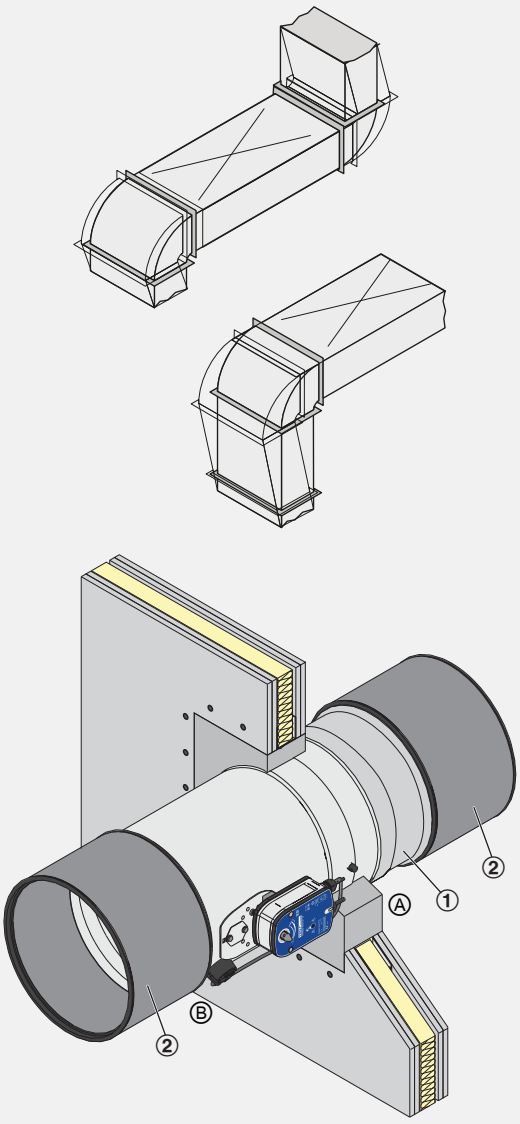
– in lightweight partition walls
– in lightweight shaft walls
– in lightweight fire walls

The flexible connectors should be installed in such a way that both tension and compression can be compensated. Flexible ducts can be used as an alternative.

If flexible connectors are used, equipotential bonding must be ensured. → P. 23

For arrangement of extension piece, refer to table
Page 22

Limiting loads by brackets and turns



① Extension piece
② Flexible connector
Ⓐ Installation side
Ⓑ Operating side

7 Connecting the duct

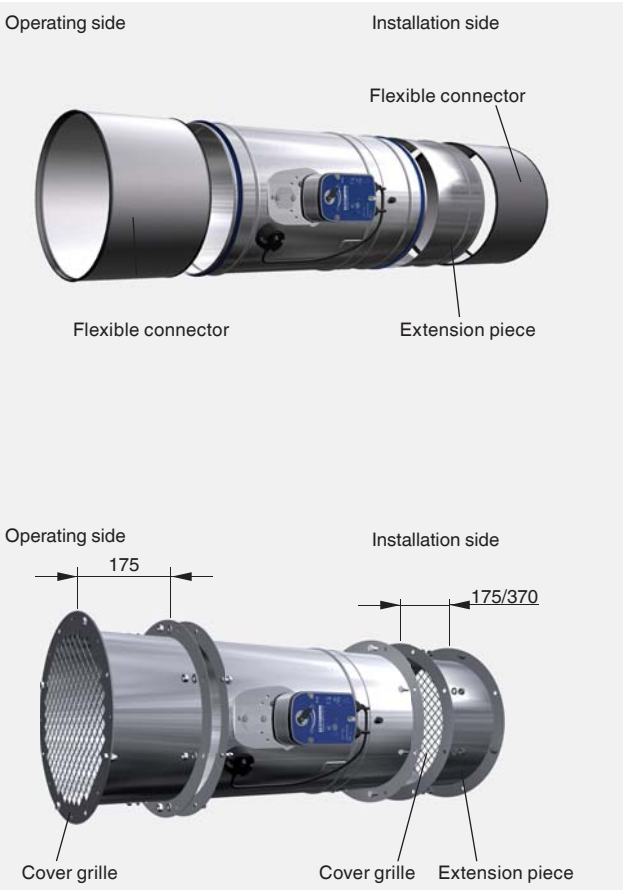
Cover grille

If only one end is to be ducted on site, the other end must have a cover grille.

For arrangement of extension piece, refer to table below.

Inspection access

The interior of the fire damper must remain accessible for maintenance work and cleaning. Depending on the installation configuration it may be necessary to provide inspection panels in the connecting ducts.



FKR-EU / FKR-EU-FL Length extension piece dimensions in mm				
Nominal size	Operating side		Installation side	
	Cover grille	Flexible connector	Cover grille	Flexible connector
315	175 / –	– / –	175 / 175	175 / 175
355	175 / –	– / –	175 / 175	175 / 175
400	175 / –	– / –	175 / 175	175 / 175
450	175 / –	– / –	370 / 175	370 / 175
500	175 / –	– / –	370 / 370	370 / 370
560	175 / –	– / –	370 / 370	370 / 370
630	175 / –	– / –	370 / 370	370 / 370
710	175 / –	– / 175	370 / 370	370 / 370
800	175 / 175	175 / 175	370 / 370	370 / 370

8 Electrical connection

Danger!
Danger of electric shock! Do not touch any live components! Electrical equipment carries a dangerous electrical voltage.

- Only skilled qualified electricians are allowed to work on the electrical system.
- Switch off the power supply before working on any electrical equipment.

For any wiring work comply with the guidelines of the VDE (Association for Electrical, Electronic and Information Technologies).

Equipotential bonding

If equipotential bonding is a requirement, there must be an electrical earth connection from the flexible connector to the ducting.

In case of a fire, mechanical loads from the equipotential bonding must not affect the fire damper.

Limit switches for FKR-EU with fusible link

The limit switches must be connected according to the wiring example opposite.

Indicator lights or relays can be connected as long as the performance specifications are taken into consideration.

The limit switches can be used as make or break contacts for signalling purposes.

FKR-EU with spring return actuator

The FK-EU fire damper may be equipped with a spring return actuator for a supply voltage of 230 V AC or 24 V AC/DC. Observe the performance data on the rating plate. Connect the spring return actuator according to the wiring example opposite.

Several actuators can be connected in parallel as long as the performance specifications are taken into consideration.

BF24-T-ST-2 TR/BLF24-T-ST TR must only be connected to safety transformers.

The connecting cables of the BF24-T-ST-2 TR/ BLF24-T-ST TR are fitted with plugs. This ensures quick and easy connection to the TROX AS-i bus system.

For connection to the terminals, shorten the connecting cable.

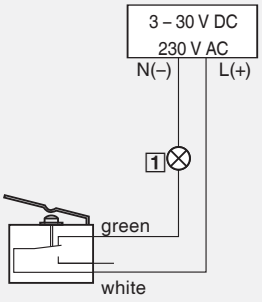
AS-i/LON modules

To connect AS-i or LON modules refer to the project-specific wiring diagrams.

For further information on AS-i and LON refer to our website: www.troxtechnik.com.

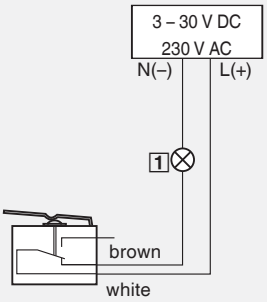
Wiring example for limit switch

CLOSED or OPEN position not reached – limit switch is not actuated



Break contact:
green/white

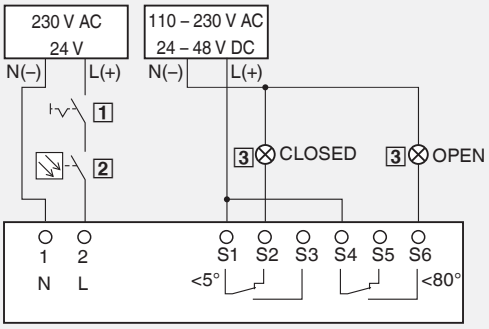
CLOSED or OPEN position reached – limit switch is actuated



Make contact:
brown/white

1 Indicator light or relay, to be provided by others

Wiring example for spring return actuator



1 Switch for opening and closing, to be provided by others

2 Optional release mechanism, e.g. TROX smoke detector type RM-O-3-D or RM-O-VS-D

3 Indicator light, to be provided by others

9 Functional test

General information

During operation at normal temperatures, the damper blade is open. A functional test involves closing the damper blade and opening it again. The procedures are different for the FKR-EU with a fusible link and for the FKR-EU with spring return actuator. → P. 25

Important!
Danger of injury during the operation of the fire damper.

There is a danger of injury in the damper blade area and in the swivelling range of the operating lever.

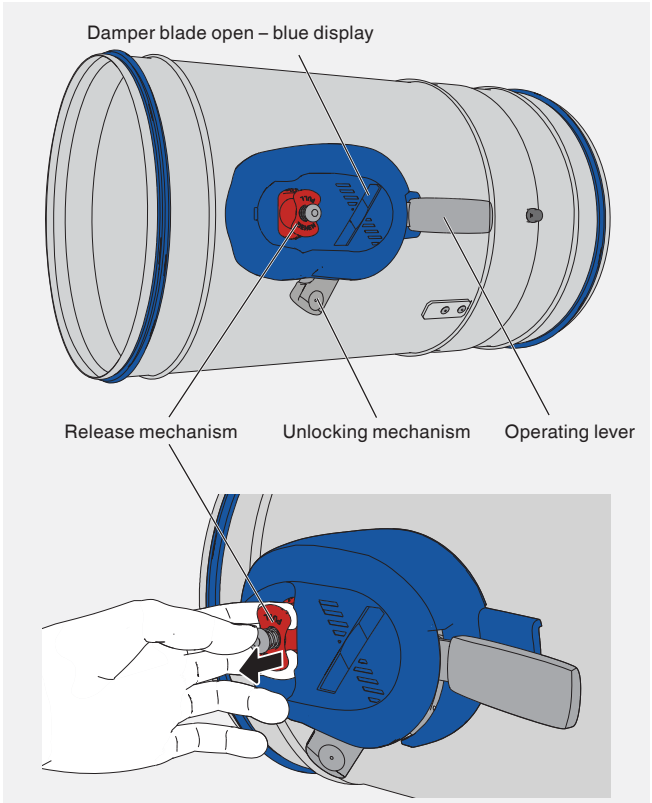
Do not reach into the fire damper swivelling range of the operating lever while actuating the release mechanism.

FKR-EU with fusible link

Closing the damper blade

To close the damper blade (manual release), proceed as follows:

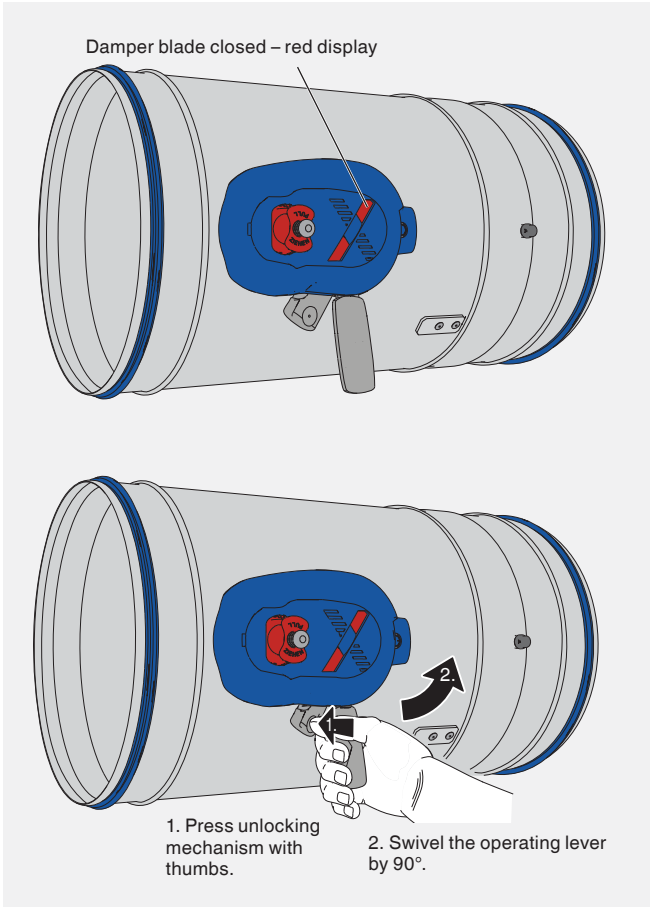
1. Grasp the release mechanism as shown with the thumb and middle fingers.
2. Pull the release mechanism towards you with both fingers. The damper blade closes automatically and locks in the CLOSED position.



Opening the damper blade

To open the damper blade, proceed as follows:

1. With your right hand, grasp the handle as shown and press down the unlocking mechanism with your thumb.
2. After that, turn the handle anti-clockwise to the travel stop. The damper blade engages in the OPEN position.



9 Functional test

FKR-EU with spring return actuator

Important!
Danger of injury when reaching into the fire damper while the damper blade is moving.

Do not reach into the fire damper while actuating the release mechanism. Make sure that the damper blade cannot be released inadvertently.

Closing/opening the damper blade with spring return actuator

When power is supplied to the actuator, the functional test can be performed either by remote control from the central BMS or by actuating the release mechanism on the fire damper.

To perform a functional test locally, proceed as follows:

1. Interrupt the power supply by pushing and holding the toggle switch.
   The spring return actuator causes the damper blade to close.
2. Reconnect the power supply by letting go of the toggle switch.↵The spring return actuator opens the damper blade.
   The spring return actuator causes the damper blade to open.

Opening the damper blade using the crank handle

Warning!
Danger due to malfunction of the fire damper.

If the damper blade has been opened by means of the crank handle (without power supply), it will no longer be triggered by a temperature increase, i.e. in case of a fire. In other words, the damper blade will not close.
To re-establish its function, connect the power supply.

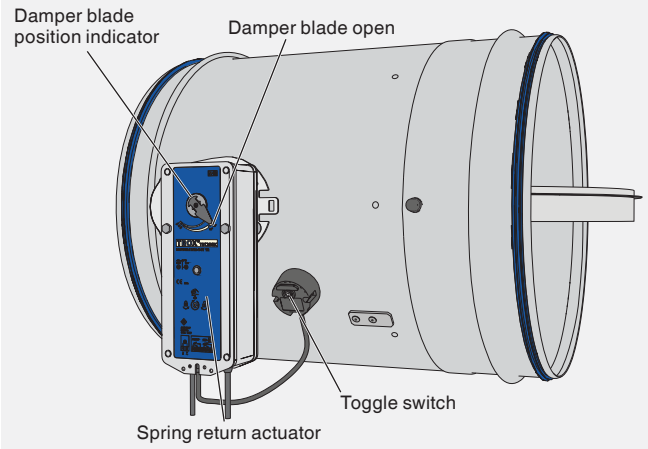
To open the damper blade, proceed as follows:

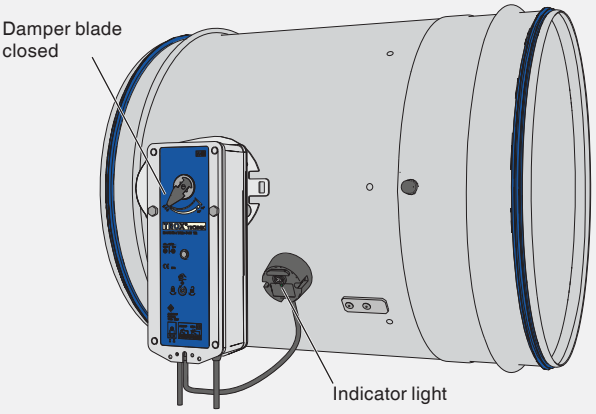
1. Insert the crank handle into the opening for the spring-winding mechanism.
   (The crank handle is fixed to the connecting cable.)
2. Turn the crank handle anti-clockwise to just short of the travel stop.
3. Then quickly turn the crank handle clockwise by about 90°.
   The damper blade remains in the OPEN position.
4. Remove the crank handle.

Closing the damper blade using the crank handle

To close the damper blade (manual release), proceed as follows:

1. Insert the crank handle into the opening for the spring-winding mechanism.
2. Turn the crank handle anti-clockwise by about 90° until a click can be heard.
   The spring return actuator causes the damper blade to close.
3. Remove the crank handle.

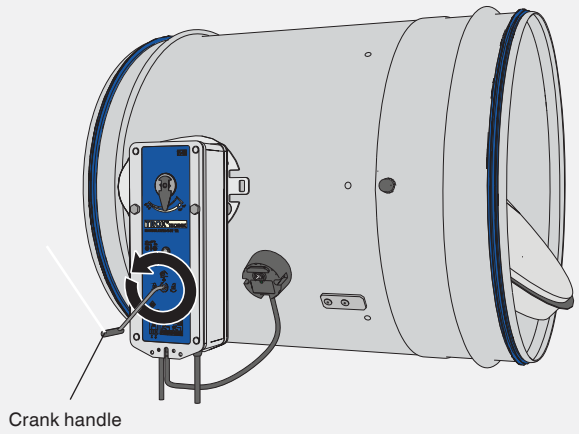




The indicator light is illuminated when all of the following conditions apply:

- power is supplied
- the thermal fuses are intact
- the toggle switch is not being pushed

Opening the damper blade using the crank handle



10 Commissioning

Before commissioning, each fire damper must be inspected to determine and assess its actual condition.

The inspection measures to be taken are listed in the table on → P. 30.

Operation

After commissioning and the subsequent inspection, the fire damper will operate independently and require no intervention on the part of the plant operator.

During normal operation the damper blade is open to enable air passage through the ventilation system.

If the temperature in the duct or the ambient temperature rises in case of a fire, a thermal release mechanism is triggered and closes the damper blade.

11 Maintenance

Danger!
Danger of electric shock! Do not touch any live components! Electrical equipment carries a dangerous electrical voltage.

- Only skilled qualified electricians are allowed to work on the electrical system.
- Switch off the power supply before working on any electrical equipment.

Important!
Danger due to inadvertently actuating the fire damper.

Inadvertent actuation of the damper blade or other parts can lead to injuries. Make sure that the damper blade cannot be released inadvertently.

Regular care and maintenance ensure operational readiness, functional reliability, and long service life of the fire damper.

Maintenance should be carried out according to EN 15423 and EN 13306. For Germany, DIN 31051 also applies.

The operator of the system is responsible for the maintenance of the fire damper. The operator is responsible for creating a maintenance plan, for defining the maintenance objectives, and for the functional reliability of the fire damper.

Maintenance

The FKR-EU fire damper and the spring return actuator are maintenance-free with regard to wear but fire dampers must still be included in the regular cleaning of the ventilation system.

Inspection

The fire damper must be inspected before commissioning.

After that, the functional reliability of the fire damper must be tested at least every six months. If two consecutive tests within six months are successful, the next test can be conducted one year later. Local requirements and building regulations must be complied with.

The inspection measures to be taken are listed in the table on → P. 30.

The test of each fire damper must be documented and evaluated. If the requirements are not fully met, suitable remedial action must be taken.

Repair

For safety reasons, repair work must only be carried out by expert qualified personnel or the manufacturer. Only original replacement parts are to be used. A functional test is required after any repair work.

11 Maintenance

Lubricating points

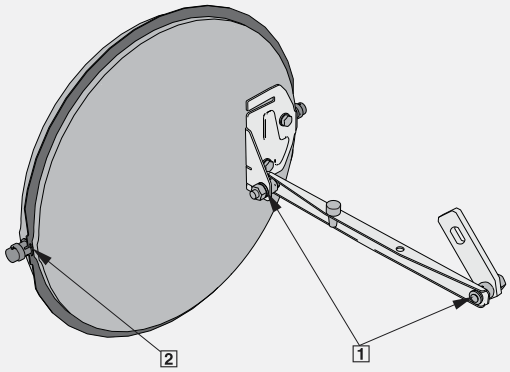
Lubricate the lubricating points 1 and 2 only if the damper blade cannot be opened or closed easily. Use only oil or grease that is free of resins or acids.

Warning!
Danger of injury when reaching into the fire damper while the damper blade is moving.

Make sure that the damper blade cannot be released inadvertently.

Do not touch the release mechanism or reach into the fire damper while actuating the release mechanism.

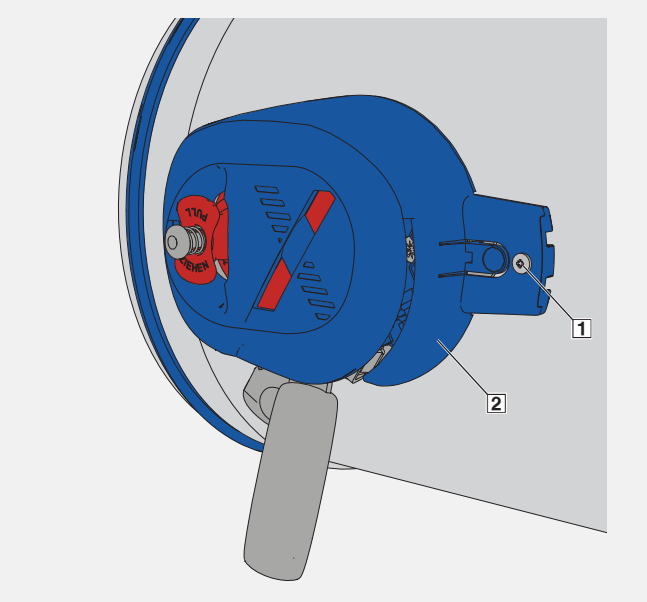
FKR-EU with fusible link and spring return actuator



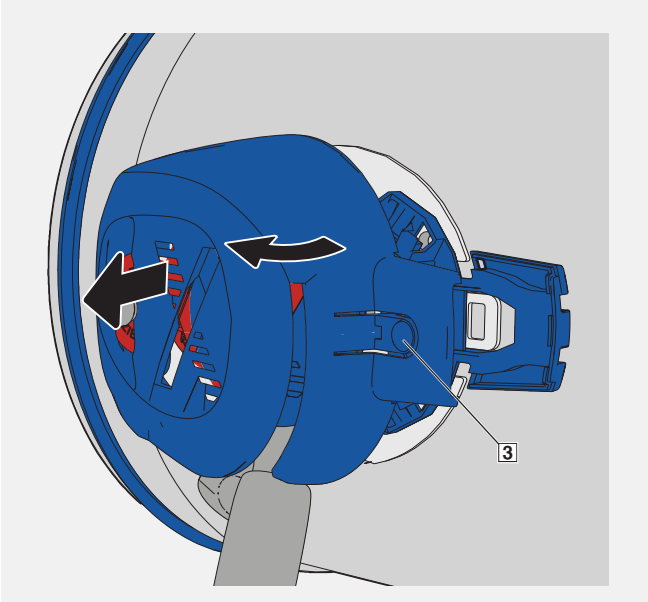
FKR-EU lubricating points		
Item	**Interval**	**Description**
1	as required	Push rod bearings
2	as required	Damper blade bearings (both sides)

11 Maintenance

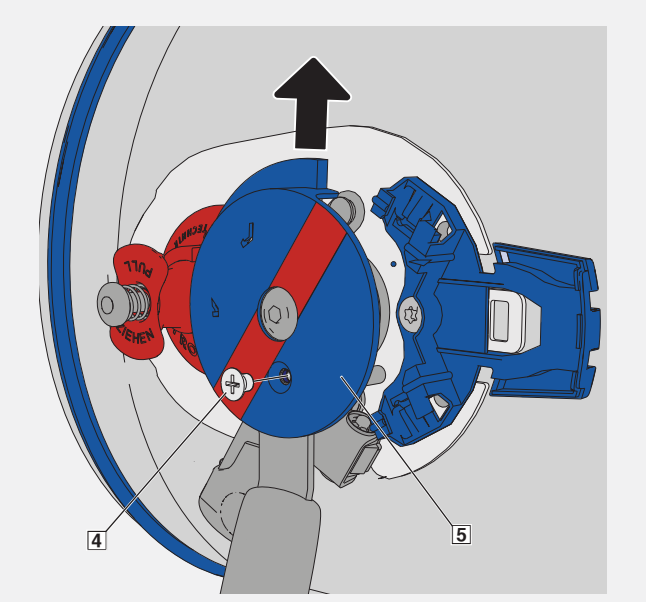
Replacing the fusible link



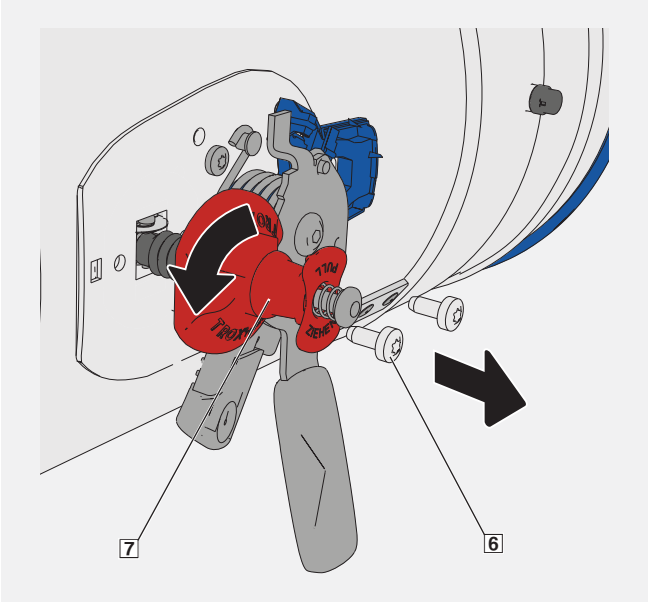
Close the damper blade.
Loosen the screw [1] of the cover [2].



Press the button [3] on the cover [2] and swivel the cover in the direction of the arrow. Pull the cover forwards and off.



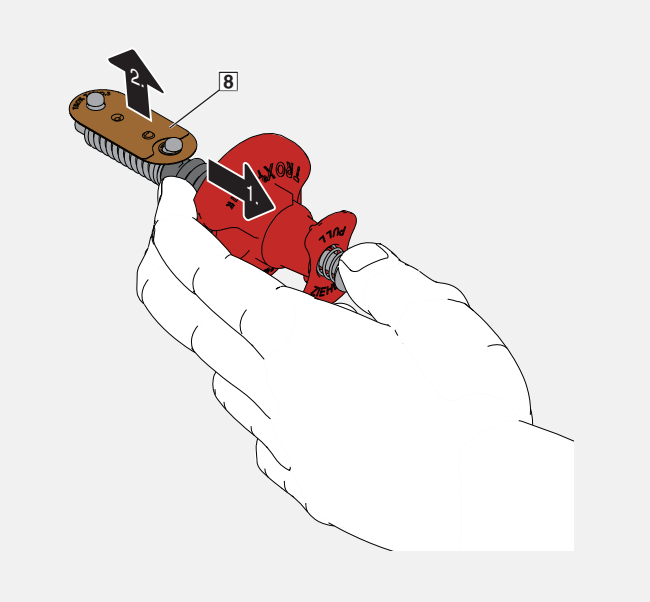
Loosen the screw [4] and pull off the graduated dial [5].



Release the screws [6] of the fusible link holder [7] and pull it forwards while turning the fusible link holder by 90°.

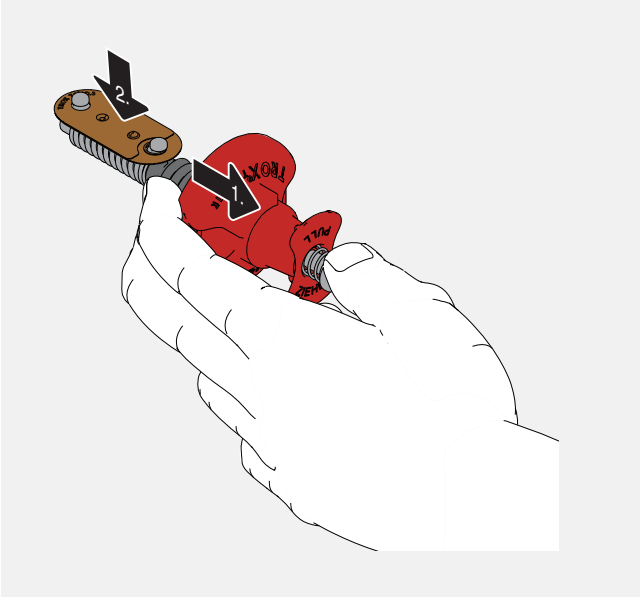
11 Maintenance

Replacing the fusible link



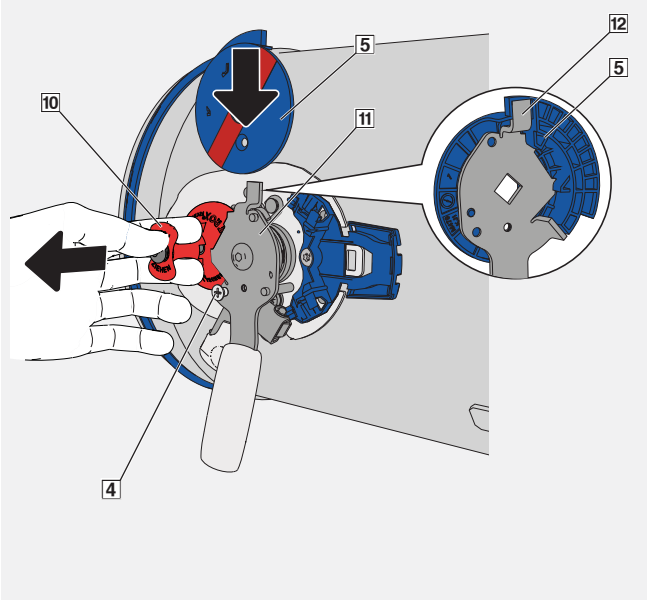
Grasp the fusible link holder as shown. Move your middle and index fingers in the direction of the arrow.

Remove the used fusible link.



Insert the new fusible link.

Put fusible link holder back into the fire damper and fix it with screws [6].

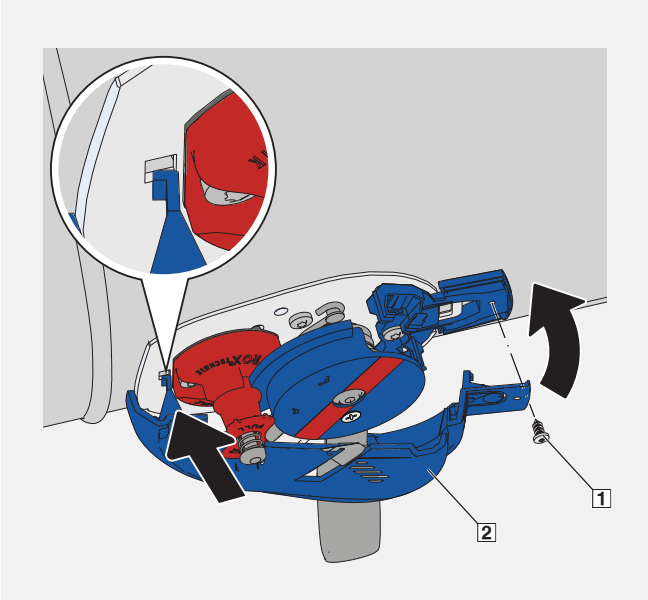


Pull the release mechanism [10] forwards and hold it.

Push the graduated dial [5] onto the lever [11] from the top.

Make sure that the graduated dial engages in the bent lug [12].

Attach the graduated dial using a screw [4].



Hang the cover [2] into place and swivel it in the direction of the arrow.

The cover locks into place. Attach the cover with a screw [1].

Carry out a functional test.→ P. 24

11 Maintenance

Inspection, maintenance and repair measures

Item to be checked	Interval			Required condition	Remedial action if necessary
	Before commis-sioning	Regu-larly	As required		
Accessibility of the fire damper	×			Internal and external accessibility	Provide access.
Installation of the fire damper	×			Installation into walls/ceiling slabs according to the operating manual → P. 9 – 19	Install the fire damper correctly.
Transport/installation protection	×			Transport/installation protection has been removed	Remove transport/installation protection.
Ducting / cover grille / flexible connector	×			Connection according to the operating manual → P. 21	Establish correct connection.
Damage to the fire damper	×	×		No damage	Repair or replace the fire damper.
Power supply to the spring return actuator	×			Power supply acc. to spring return actuator rating plate	Provide correct power supply.
Contamination	×		×	No contamination inside	Clean the fire damper.
Damper blade and seal	×	×		Damper blade / seal OK	Replace the damper blade
Function of the release mechanism	×	×		Function OK	Replace the release mechanism.
Fusible link	×	×		Fusible link intact	Replace the fusible link.
Function of FKR-EU with fusible link, blade closure by manual release → P. 24	×	×		• Damper blade closes independently. • The tab on the handle locks into the CLOSED position and locks the damper blade.	Replace the release mechanism.
Function of FKR-EU with fusible link, blade opening by manual release → P. 24	×	×		• Damper blade can be opened manually. • Handle can be locked into the OPEN position using the release mechanism.	• Determine and eliminate the cause of the fault. • Replace the release mechanism. • Repair or replace the fire damper.
Function of FKR-EU with spring return actuator, blade closure → P. 25	×	×		• Function of actuator OK • Damper blade closes	• Replace the spring return actuator. • Repair or replace the fire damper.
Function of FKR-EU with spring return actuator, blade opening → P. 25	×	×		• Function of actuator OK • Damper blade opens	• Replace the spring return actuator. • Repair or replace the fire damper.
Function of the external smoke detectors	×	×		Function OK	Determine and eliminate the cause of the fault.
Function of limit switches	+	+		Function OK	Replace the limit switches.
Function of the external signalling (damper blade position indicator)	+	+		Function OK	Determine and eliminate the cause of the fault.

× = Required

\+ = Recommended

12 Decommissioning, removal and disposal

Final decommissioning

1. Switch off the ventilation system.
2. Switch off the power supply.

Removal

1. Disconnect the wiring.

Danger!
Danger of electric shock! Do not touch any live components! Electrical equipment carries a dangerous electrical voltage.

- Only skilled qualified electricians are allowed to work on the electrical system.
- Switch off the power supply before working on any electrical equipment.

2. Remove the ducts.
3. Close the damper blade.
4. Remove the fire damper.

Disposal

For disposal, the fire damper must be disassembled.

Dispose of electronic components according to the local electronic waste regulations.